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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,289	03/25/2005	Manabu Suhara	268120US0PCT	2037

22850 7590 07/03/2007

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EXAMINER	
WANG, EUGENIA	

ART UNIT	PAPER NUMBER
1745	

NOTIFICATION DATE	DELIVERY MODE
07/03/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/529,289	SUHARA ET AL.	
	Examiner	Art Unit	
	Eugenia Wang	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on 3/22/07.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1, 3-5, 16, 18 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,3-5,16 and 18 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 4/6/07.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. In response to the amendment received on March 22, 2007:

a. Claims 1, 3, 4, 5, 16, and 18 are pending. (The other claims have been withdrawn from consideration, as they are drawn to a non-elected invention.)

b. A new rejection is made, not fully necessitated by the amendment, thus this action is non-final.

Information Disclosure Statement

The information disclosure statement filed April 6, 2007 has been placed in the application file and the information referred to therein has been considered as to the merits.

Specification

2. The abstract of the disclosure is objected to because it is more than one paragraph and is more than 150 words in length. Correction is required. See MPEP § 608.01(b).

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1, 3, 5, 16, and 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claim 1, the positive active material is said to have two different particles, however the claim language fails to differentiate the difference between the first particles and the second particles. Therefore, in claim 1, the first and second particles can be the same material. Without a more positive definition for the second particles, claim 1 is indefinite, as it fails to distinctly claim the second particles. Since claims 3, 5, 16, and 18 are dependent on claim 1 and fail to rectify this issue, they are rejected as well.

6. Claim 3 recites the limitation "the average particle size D50" in line 2. There is insufficient antecedent basis for this limitation in the claim. Without reference to which particle the size applies to (since both first and second particles have an average particle size), it is unclear as to which average particle size is being further defined. (For the purpose of prosecution, the range of 5-15 μm is interpreted to apply to the first particles, as defined within claim 1).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1, 4, 16, and 18 are alternately rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2003-257416 (Moriuchi et al.) in view of US 6103213 (Nakamura et al.).

As to claims 1, 16, and 18, Moriuchi et al. teach the use of Li-Co composite oxide materials used a positive electrode (abs). The materials used are a mixture of particles having two different mean sizes, the first particles having a mean particle size between 7-13 μm and the second particles having a mean particle size between 1-6 μm (abs). Furthermore, a ratio in which the two particle sizes are used is discussed: a ratio of

1:0.2 to 1.5 (abs). Most of the ratio range previously discussed fits that of the instant application, as can be easily compared by converting the ratios. The claimed range, if converted to be compared to 1 part of first particles is between 1:0.11 to 2 (since 9:1 / (9/9) = 1/0.11). The particle distribution of size D10 is 2 to 6 μm; the particle distribution of size D90 is 15 to 25μm (para 24). At least a portion of the size distributions fit that of the range claimed by the instant application. For example, regarding D10 in comparison to D50 (the mean particle size), if D10 was from 5-6 μm and D50 was from 7-12 μm, D10 would be at least 50% of D50. Likewise, overlapping ranges for D90 to D50 comparisons. If D90 was from 15-18 μm and D50 was 12 μm, D90 would be no more than 150% of D50. Lastly, the particles used by Moriuchi et al. is substantially spherical shaped, as it is stated that the particles are assumed to be the projection image acquired by the exposure of laser light, a sphere with a circular cross section (para 0023, lines 7-12). Lastly, it is noted that the material taught by Moriuchi et al. is used for a positive electrode for a lithium ion secondary battery (title) (as applied to claims 16 and 18).

However, it can be interpreted that Moriuchi et al.'s range of D10 and D90 compared to D50 covers a range outside of that claimed by the instant application (where D10 is at least 50% of D5 and where D90 is no more than 150% of D50). In this case, Nakamura et al. teach lithium-cobalt oxide particles with a narrow particle size distribution that is used as cathode substances for lithium ion batteries (abs). The motivation for having a uniform particle shape and particle size is for higher packing density, which helps obtain a higher battery capacity (col. 1, lines 63-67). Therefore it

would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to try to make particles that are nearly uniform in size to produce a battery with a higher packing density, which results in higher battery capacity. (Note: Although a small distribution is not defined, it is clear that a more uniform particle size is desirable, thus obviating the range of D10 being at least 50% of D5 and D90 being no more than 150% of D50.)

As to claim 4, Moriuchi et al. teach that the first particles have a size between 7-13 μm and that the second particles having a mean particle size between 1-6 μm (abs). Therefore the range taught by Moriuchi et al. encompasses most of range claimed by the instant application. Again, at least a portion of the size distributions fit within the relationship of the required by the instant application. For example a second particle size of 3 fits with a first particle size of the entire range of Moriuchi et al. (7-13 μm).

8. Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moriuchi et al. and Nakamura et al. (as applied to claim 1) in further view of US 2001/0010807 (Matsubara).

As to claim 3, Moriuchi et al. teach that the mean particle size (D50) of the first particle is 7-13 μm (abs). However, Moriuchi et al. does not disclose the surface area and press density of the positive electrode active material.

Matsubara discloses a lithium nickel cobalt oxide as the active material of a positive electrode for a rechargeable battery. The electrode active material has a specific surface area of 0.1 to 2 m^2/g (which overlaps the range that is claimed in the instant application) and an average particle size of 5 to 30 μm (para 0026). The

particle sizes are such that 10% of the particle size distribution is 0.5D and 90% is 2D or lower (with D being the average particle size) (para 0017). The press density is between 1 to 4 g/cm^3 (which overlaps the range that is claimed in the instant application) (para 0056). It has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985). Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

Due the fact that similar materials having similar material characteristics are used by the Matsubara piece and the instant application (as well as the Moriuchi et al. piece), the half value width of the diffraction peak on (110) plane at $2\theta=66.5\pm1°$ from 0.07 to 0.14° is inherent. Furthermore, Matsubara teaches that the press density of the active material is important in that it decreases the moving distance between the particles and accelerates the crystal growth of the material (para 0057). The motivation for having a high surface area is to maximize surface area of the active material, and the motivation for having a high press density is decrease the moving distance between the particles. Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to modify the lithium cobalt oxide material of Moriuchi

et al. to include having a surface area ranging from 0.3 to 0.7 m^2/g and a press density 3.1 to 3.4 g/cm^3 as claimed in the instant application and taught within the ranges of by Matsubara in order to increase the density of the material to achieve higher capacity battery with an high charge/discharge rate.

As to claim 5, Moriuchi et al. does not teach the press density of either the first or second particles. However, Matsubara teaches a lithium/nickel/cobalt composite oxide for a cathode active material (title). The press density given for the product is between 1-4 g/cm^3 (which encompasses the ranges for both the first and second particles as claimed by the instant application 2.9-3.2 g/cm^3 and 2.7- 3.1 g/cm^3, respectively) (para 0056). It has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985). Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

Furthermore, Matsubara teaches that the press density of the active material is important in that it decreases the moving distance between the particles and accelerates the crystal growth of the material (para 0057). The motivation for having a high press density is decrease the moving distance between the particles. Therefore it

would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to modify the lithium cobalt oxide material of Moriuchi et al. such that it has a press density within the range taught by Matsubara in order to increase the density of the material to achieve higher capacity battery with an high charge/discharge rate. (Note: This press density range taught by Matsubara would be obviated for both particles used by Moriuchi et al., because both materials are included within the positive active material and would thus be subjected to the same pressing, thus making it a necessity that their press densities are within a range close to one another.)

Response to Arguments

9. Applicant's arguments with respect to claims 1, 3-5, 16, and 18 have been considered but are moot in view of the new ground(s) of rejection.

However, Examiner would still like to address some of the arguments Applicant has brought up.

Applicant argues that the combination of Moriuchi et al. and Matsubara et al. fail to teach a lithium-cobalt composite oxide having a predetermined particle size distribution with a second lithium-cobalt oxide filling the space.

Examiner's position is that Moriuchi et al. teach two different lithium-cobalt composite oxide particles, and therefore one set of particles would inherently be a filler to the other. Additionally, Moriuchi et al. teach some combination of particles that fit within the specified range of the instant application. Although a specific D10, D50, and D90 value is not positively recited, Nakamura et al. teach using a narrow particle size distribution for particles in the cathode active material, which sufficiently provides

motivation (e.g. higher packing density for higher capacity, col. 1, lines 63-67) for having a particle size distribution as claimed by the instant application.

Applicant also argues that Moriuchi et al. and Matusbara et al. fail to teach the concept of a compacted dense structure and a large volume capacity density and press density by using positive materials with such constitution.

Examiner respectfully disagrees. Matsubara et al. recognizes that the press density of the active material is important in that it decreases the moving distance between the particles and accelerates the crystal growth of the material (para 0057). Therefore a large press density would allow the battery to achieve higher capacity. Furthermore, as listed before, Nakamura et al. teaches a small size particle distribution for the same reason.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugenia Wang whose telephone number is 571-272-4942. The examiner can normally be reached on 8 - 4:30 Mon. - Fri., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

EW

GREGG CANTELMO
PRIMARY EXAMINER

21 June 2007